

Intelligent, Semi-Automated Procedure Aid (ISAPA) for ISS Flight Control, Phase II

Completed Technology Project (2006 - 2008)



Project Introduction

We propose to develop the Intelligent, Semi-Automated Procedure Aid (ISAPA) intended for use by International Space Station (ISS) ground controllers to increase the efficiency and safety of flight operations while reducing costs for NASA. ISAPA is innovative in that it is centered on a "person-in-the-loop" approach to automation. While ISAPA executes procedures, it asks the user for confirmations, decisions and allows the user to easily override. To increase situational awareness, the aid clearly presents, through notifications and advanced visualizations, what is being performed. The second major innovation is ISAPA's intuitive authoring tool which enables controllers (without programming skills) to build new and modify existing semi-automated procedures using drag-and-drop graphical widgets. As space station construction progresses and procedures change, authoring utilities allow the straightforward updating of procedures. ISAPA also supports gradual procedure automation, allowing flight controllers to migrate a manual procedure towards automation as confidence is gained. The system will integrate with existing mission control center systems, specifically: "Thin Layer" for sending commands, "Information Sharing Protocol" for receiving telemetry, and use official formats, such as "PRL", for persisting procedure data. ISAPA will also include a simulator to assist in the validation process of procedures. During Phase I, Stottler Henke developed a prototype of the ISAPA execution tool, authoring tool and simulation tools while constructing two sample procedures based on real-life controller procedures. During Phase II, Stottler Henke will develop a full ISAPA system ready for integration into the ISS MCC. Special emphasis will be placed on compliance with NASA ground console software certification. ISAPA technologies from the Technology Taxonomy are Autonomous Reasoning/Artificial Intelligence and Human-Computer Interfaces from the Information section.

Anticipated Benefits

Potential NASA Commercial Applications: The proposed technology will also be targeted toward satellite operations, Naval ship operations, maintenance, and damage control and could also be used by corporations to help their employees, customers, suppliers, value-added resellers, and other partner companies carry out procedural tasks such as performing common tasks using software or hardware products or manufacturing equipment; and maintaining, diagnosing and repairing equipment.



Intelligent, Semi-Automated Procedure Aid (ISAPA) for ISS Flight Control, Phase II

Table of Contents

Project Introduction	1
Anticipated Benefits	1
Organizational Responsibility	1
Primary U.S. Work Locations and Key Partners	2
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

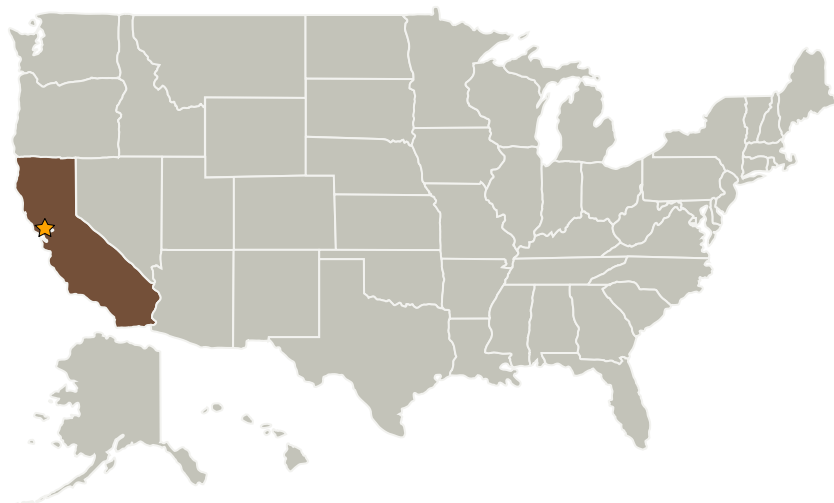
Small Business Innovation Research/Small Business Tech Transfer

Intelligent, Semi-Automated Procedure Aid (ISAPA) for ISS Flight Control, Phase II

Completed Technology Project (2006 - 2008)



Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Ames Research Center (ARC)	Lead Organization	NASA Center	Moffett Field, California
Stottler Henke Associates, Inc.	Supporting Organization	Industry	San Mateo, California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Richard R Stottler

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.3 Mission Operations and Safety
 - └ TX07.3.2 Integrated Flight Operations Systems

Primary U.S. Work Locations

California